

[Handwritten signature]



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/782,966	02/23/2004	Shinya Marushima	NIP-149-05	7565

7590 02/07/2005

MATTINGLY, STANGER & MALUR, P. C.
Suite 370
1800 Diagonal Rd.
Alexandria, VA 22314

EXAMINER

RODRIGUEZ, WILLIAM H

ART UNIT	PAPER NUMBER
----------	--------------

3746

DATE MAILED: 02/07/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/782,966

Applicant(s)

MARUSHIMA ET AL.

Examiner

William H. Rodriguez

Art Unit

3746

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 2/23/04 (preliminary amendment).
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 11-16 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 11-13 is/are rejected.
- 7) ☒ Claim(s) 14-16 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 23 February 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 2/23/04.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION***Drawings***

1. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, “*the flow path provided with a flow adjusting mechanism (claim 15); and the fluid introduced into said gap portions is exhausted therefrom into a gas path of said gas turbine (claim 16)*” must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as “amended.” If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either “Replacement Sheet” or “New Sheet” pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Art Unit: 3746

Claim Objections

2. Claims 14-16 are objected to because of the following informalities: Claims 14-16 improperly depend from a cancelled claim, claim 1. Appropriate correction is required.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 11 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Carreno et al. (U.S. 5,593,274) in view of Suenaga et al. (U.S. 5,795,130).

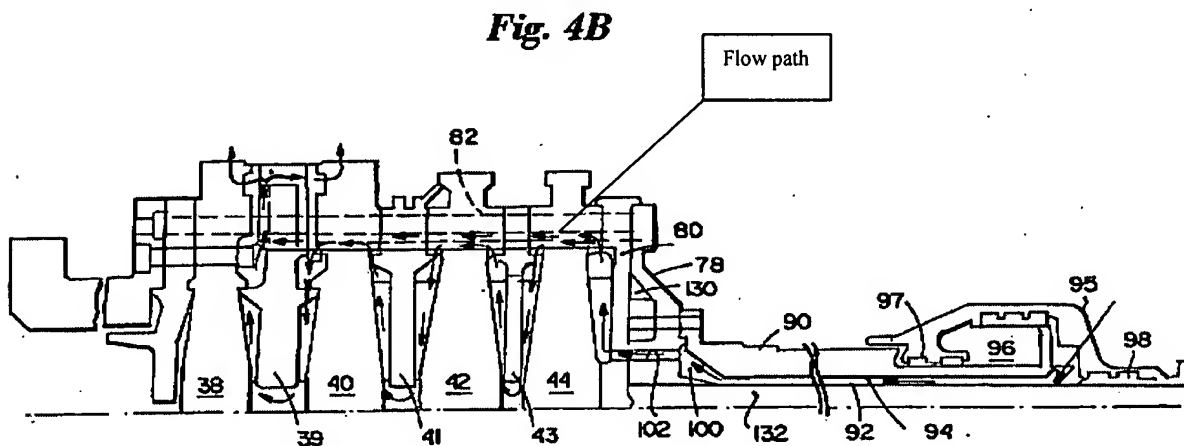
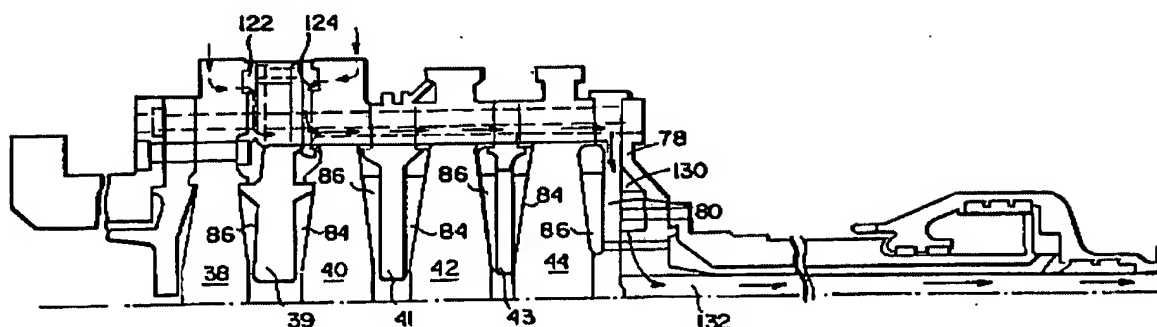


Fig. 4C**Figures 4A, 4C of Carreno.**

With respect to claim 11, **Carreno** teaches a gas turbine which a rotor shaft comprises a plurality of discs 38, 40, 42, 44 each having a plurality of moving blades arranged annularly on the peripheral portion, and spacers 39, 41, 43 arranged between said discs, said respective discs 38, 40, 42, 44 and spacers being arranged in an axial direction in turn, comprising: gap portions 84, 86 formed between rotor axis side regions of said discs 38, 40, 42, 44 facing said spacers 39, 41, 43 and adjacent spacers; a supply flow path 92 for supplying refrigerant for cooling to said moving blades and a recovery flow path 132 for recovering heated refrigerant, each of said supply and recovery flow paths being provided in said rotor shaft; a flow path (see Figure 4B) for introducing fluid into said gap portions 84, 86 provided in said discs (see particularly **Figures 4B, 4C** of **Carreno** above). **Carreno** does not schematically show that the recovery flow path is arranged on a more radially outer side than said supply flow path but said recovery flow path 132 is arranged on a more radially inner side than said supply flow path 92. However, **Suenaga** teaches a typical heat recovery type gas turbine similar to **Carreno's** heat recovery type gas

Art Unit: 3746

turbine, wherein the recovery flow path 11 is arranged on a more radially outer side than said supply flow path 11. Accordingly, it would have been prima facie obvious to one of ordinary skill in the art at the time the invention was made to have modified Carreno (as taught by Suenaga) such that the recovery flow path is arranged on a more radially outer side than said supply flow path because such a modification would have not affected the efficient operation of Carreno's gas turbine and further such modification would have been considered a mere design consideration which fails to patentably distinguish over Carreno. See particularly **Figure 1** of Suenaga.

With respect to claim 12, **Carreno** teaches a gas turbine which a rotor shaft comprises a plurality of discs 38, 40, 42, 44 each having a plurality of moving blades arranged annularly on the peripheral portion, and spacers 39, 41, 43 arranged between said discs, said respective discs 38, 40, 42, 44 and spacers being arranged in an axial direction in turn, comprising: gap portions 84, 86 formed between rotor axis side regions of said discs 38, 40, 42, 44 facing said spacers 39, 41, 43 and adjacent spacers; a supply flow path 92 for supplying steam for cooling to said moving blades and a recovery flow path 132 for recovering heated steam, each of said supply and recovery flow paths being provided in said rotor shaft; a flow path (see Figure 4B) for introducing fluid into said gap portions 84, 86 provided in said discs (see particularly **Figures 4B, 4C**, and column 1 lines 65-67 of Carreno). **Carreno** does not schematically show that the recovery flow path is arranged on a more radially outer side than said supply flow path but said recovery flow path 132 is arranged on a more radially inner side than said supply flow path 92. However, **Suenaga** teaches a typical heat recovery type gas turbine similar to Carreno's heat recovery type gas turbine, wherein the recovery flow path 11 is arranged on a more radially outer

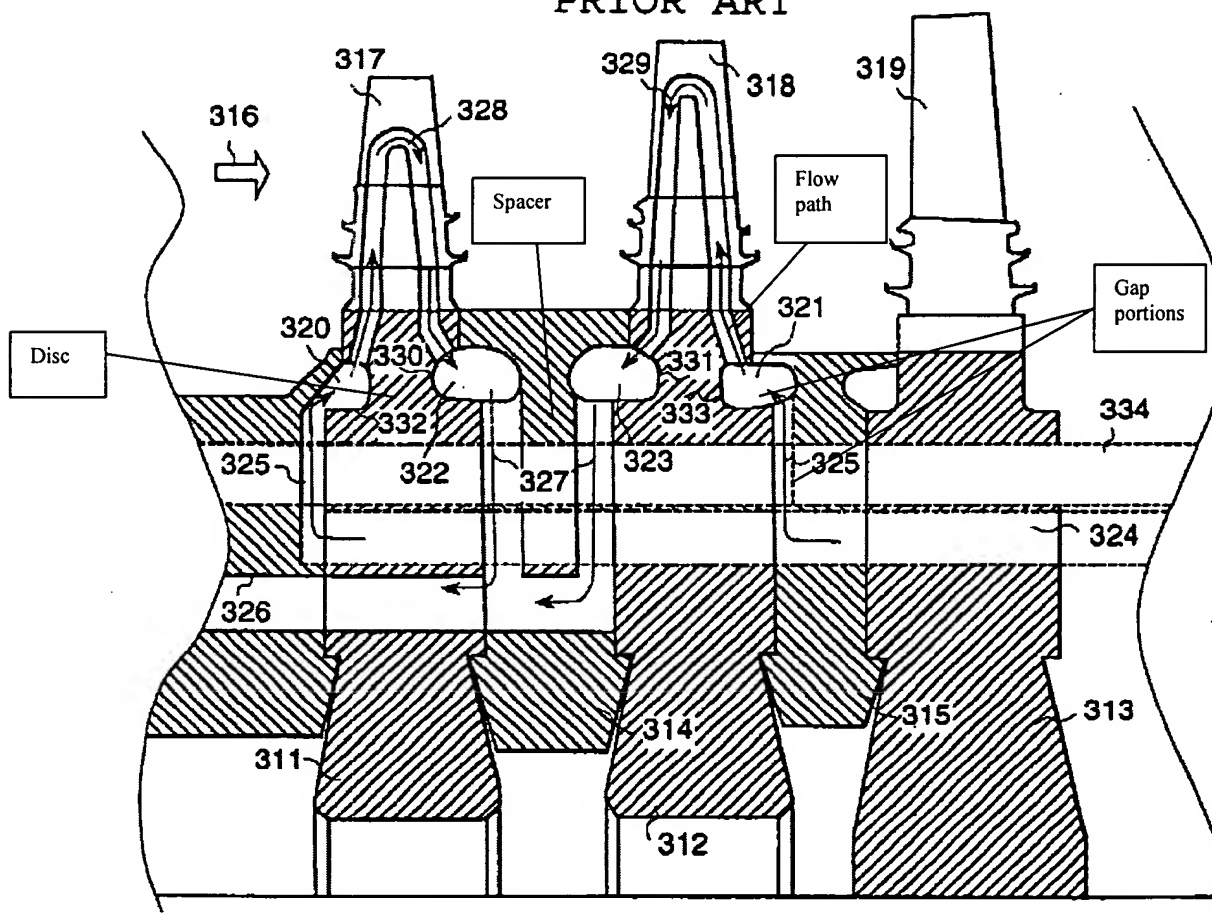
Art Unit: 3746

side than said supply flow path 11. Accordingly, it would have been prima facie obvious to one of ordinary skill in the art at the time the invention was made to have modified Carreno (as taught by Suenaga) such that the recovery flow path is arranged on a more radially outer side than said supply flow path because such a modification would have not affected the efficient operation of Carreno's gas turbine and further such modification would have been considered a mere design consideration which fails to patentably distinguish over Carreno. See particularly **Figure 1** of Suenaga.

Art Unit: 3746

5. Claims 11-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Akiyama et al.** (U.S. 6,334,756) in view of **Suenaga et al.** (U.S. 5,795,130).

FIG. 25
PRIOR ART



With respect to claim 11, **Akiyama** teaches a gas turbine which a rotor shaft comprises a plurality of discs each having a plurality of moving blades arranged annularly on the peripheral portion, and spacers arranged between said discs, said respective discs and spacers being arranged in an axial direction in turn, comprising: gap portions formed between rotor axis side

Art Unit: 3746

regions of said discs facing said spacers and adjacent spacers; a supply flow path 324 for supplying refrigerant for cooling to said moving blades and a recovery flow path 326 for recovering heated refrigerant, each of said supply and recovery flow paths being provided in said rotor shaft; a flow path for introducing fluid into said gap portions provided in said discs (see particularly **Figure 25** of **Akiyama** above). **Akiyama** does not schematically show that the recovery flow path is arranged on a more radially outer side than said supply flow path but said recovery flow path 326 is arranged on a more radially inner side than said supply flow path 324. However, **Suenaga** teaches a typical heat recovery type gas turbine similar to **Akiyama's** heat recovery type gas turbine, wherein the recovery flow path 11 is arranged on a more radially outer side than said supply flow path 11. Accordingly, it would have been prima facie obvious to one of ordinary skill in the art at the time the invention was made to have modified **Akiyama** (as taught by **Suenaga**) such that the recovery flow path is arranged on a more radially outer side than said supply flow path because such a modification would have not affected the efficient operation of **Akiyama's** gas turbine and further such modification would have been considered a mere design consideration which fails to patentably distinguish over **Akiyama**. See particularly **Figure 1** of **Suenaga**.

With respect to claim 12, **Akiyama** teaches a gas turbine which a rotor shaft comprises a plurality of discs each having a plurality of moving blades arranged annularly on the peripheral portion, and spacers arranged between said discs, said respective discs and spacers being arranged in an axial direction in turn, comprising: gap portions formed between rotor axis side regions of said discs facing said spacers and adjacent spacers; a supply flow path 324 for

Art Unit: 3746

supplying steam for cooling to said moving blades and a recovery flow path 326 for recovering heated steam, each of said supply and recovery flow paths being provided in said rotor shaft; a flow path for introducing fluid into said gap portions provided in said discs (see particularly **Figure 25**; and column 5 lines 40-46 of **Akiyama**). **Akiyama** does not schematically show that the recovery flow path is arranged on a more radially outer side than said supply flow path but said recovery flow path 326 is arranged on a more radially inner side than said supply flow path 324. However, **Suenaga** teaches a typical heat recovery type gas turbine similar to **Akiyama**'s heat recovery type gas turbine, wherein the recovery flow path 11 is arranged on a more radially outer side than said supply flow path 11. Accordingly, it would have been prima facie obvious to one of ordinary skill in the art at the time the invention was made to have modified **Akiyama** (as taught by **Suenaga**) such that the recovery flow path is arranged on a more radially outer side than said supply flow path because such a modification would have not affected the efficient operation of **Akiyama**'s gas turbine and further such modification would have been considered a mere design consideration which fails to patentably distinguish over **Akiyama**. See particularly **Figure 1** of **Suenaga**.

With respect to claim 13, **Akiyama** teaches a gas turbine which a rotor shaft comprises a plurality of discs each having a plurality of moving blades arranged annularly on the peripheral portion, and spacers arranged between said discs, said respective discs and spacers being arranged in an axial direction in turn, comprising: gap portions formed between rotor axis side regions of said discs facing said spacers and adjacent spacers; a supply flow path 324 for supplying steam for cooling to said moving blades and a recovery flow path 326 for recovering

Art Unit: 3746

heated steam, each of said supply and recovery flow paths being provided in said rotor shaft; a flow path for introducing fluid into said gap portions provided in said discs; wherein said flow path for introducing fluid into said gap portion is constructed so as to be supplied with air extracted from a compressor (see particularly **Figure 25**; and column 5 lines 40-46 of **Akiyama**). **Akiyama** does not schematically show that the recovery flow path is arranged on a more radially outer side than said supply flow path but said recovery flow path 326 is arranged on a more radially inner side than said supply flow path 324. However, **Suenaga** teaches a typical heat recovery type gas turbine similar to **Akiyama**'s heat recovery type gas turbine, wherein the recovery flow path 11 is arranged on a more radially outer side than said supply flow path 11. Accordingly, it would have been prima facie obvious to one of ordinary skill in the art at the time the invention was made to have modified **Akiyama** (as taught by **Suenaga**) such that the recovery flow path is arranged on a more radially outer side than said supply flow path because such a modification would have not affected the efficient operation of **Akiyama**'s gas turbine and further such modification would have been considered a mere design consideration which fails to patentably distinguish over **Akiyama**. See particularly **Figure 1** of **Suenaga**.

Note that **Akiyama** (column 5 lines 40-46) teaches using a combination of air and steam for cooling, just as claimed by the invention in claim 13.

Allowable Subject Matter

6. Claim 14 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Art Unit: 3746

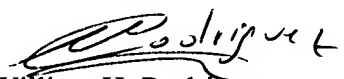
Claims 15 and 16 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims and the drawings objections are overcome.

Contact information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to William H. Rodriguez whose telephone number is 571-272-4831. The examiner can normally be reached on Monday-Friday 7:30 am to 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cheryl J Tyler can be reached on 571-272-4834. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


William H. Rodriguez
Examiner
Art Unit 3746